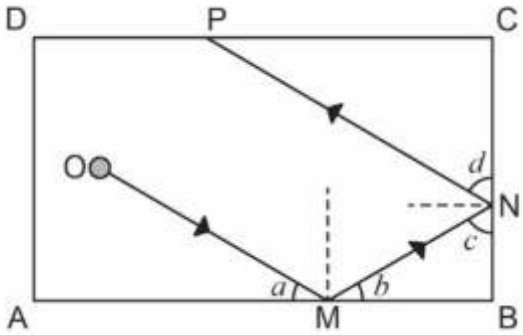
Curriculum Aligned Competency Based Test Items
Mathematics
Class 9 – Chapter 6
Lines and Angles

The game of billiards is played with balls placed on a rectangular table. One ball is struck with the end of a stick, called a cue. The ball bounces into other balls and reflects off the sides of the table. In a real game, the ball may spin, but for mathematical purposes, it is considered that the ball travels in a straight line with the same reflection and incidence angles.



On a billiard table ABCD, the ball placed at O is struck with the cue.

SAS21M09G0601

1 What is the value of ∠a + ∠d?

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SAS21M09G0602

2 Why is the line OM parallel to PN?

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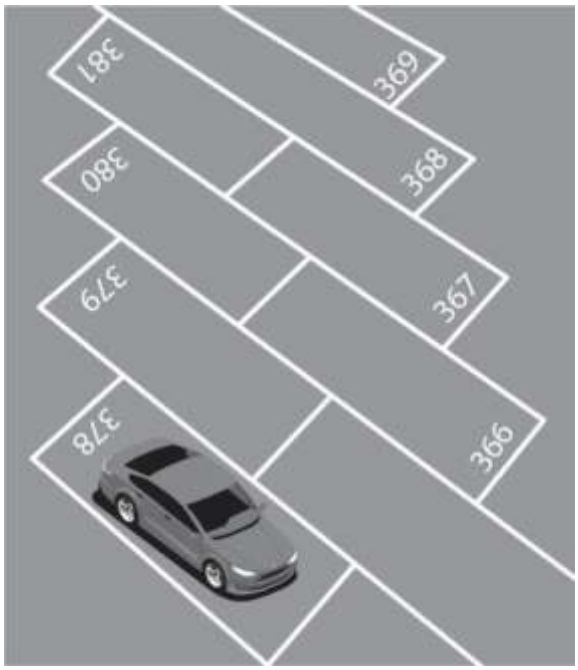
A parking lot for a city mall is shown below. The painted lines that separate the parking spaces are parallel.



SAS21M09G0603

3 Parking space number 378 is inclined at 60° to the horizon line. At what angle is parking space 380 inclined to the horizontal line? Why?

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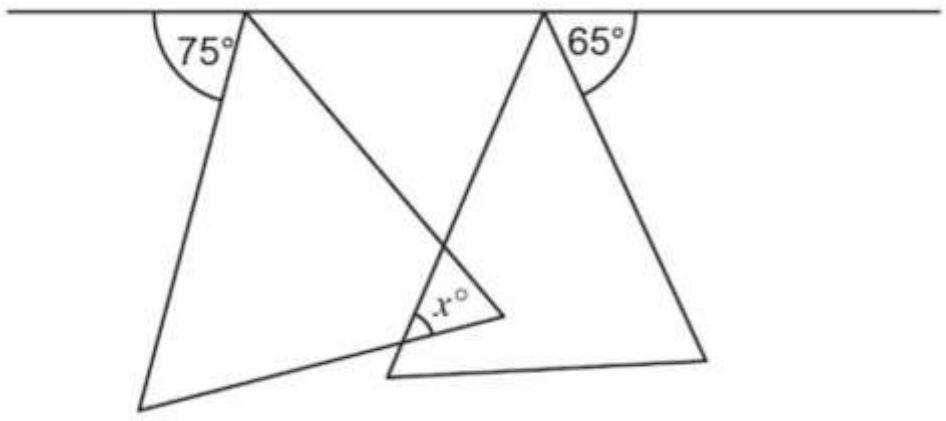
Two equilateral triangles on a straight line are shown below.

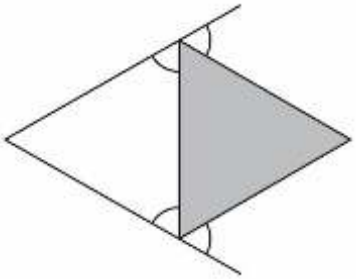


SAS21M09G0604

4 What is the measure of 'x'?

A. 30
B. 40
C. 60
D. 65

The figure below shows an equilateral triangle bounded by two straight lines.

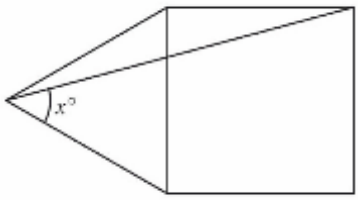


SAS21M09G0605

5 What is the sum of the four marked angles?

A. 180°
B. 240°
C. 270°
D. 360°

The figure below consists of a square and an equilateral triangle connected together with a common side.

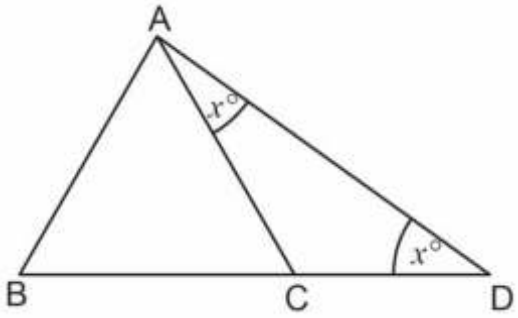


SAS21M09G0606

6 What is the measure of 'x'?

A. 15
B. 30
C. 45
D. 60

In the figure below, BC = AC.

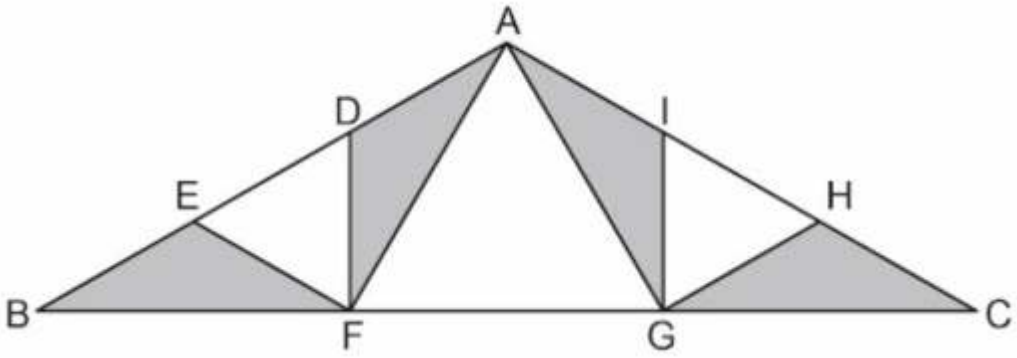


SAS21M09G0607

7 What is the measure of ∠BAD?

A. 30°
B. 60°
C. 75°
D. 90°

The figure below consists of a square and an equilateral triangle connected together with a common side.



In the design, DF and IG are two iron rods perpendicular to BC. The measure of ∠BAC = 120°.

SAS21M09G0608

8 Which type of triangle is ABC? Why?

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_____

SAS21M09G0609

9 The central triangle AFG is equilateral. What is the measure of ∠FDA?

A. 30°
B. 60°
C. 90°
D. 120°

SAS21M09G0610

10 The length of IG is half of the length of GC. Write a proof for the statement.

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Answers

Item Number	Question 1
Question Code	SAS21M09G0601
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry/Parallel Lines | Alternate Exterior Angles
Competency	Employ
Item Type	Closed Constructed Response
Full Credit (Full Score)	90 90°
No Credit (No Score)	Any other response or missing response

Item Number	Question 2
Question Code	SAS21M09G0602
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry/Parallel Lines | Alternate Exterior Angles
Competency	Employ
Item Type	Closed Constructed Response
Full Credit (Full Score)	Mathematically valid proof Let angles on line AMB be a, x and b and angles on line BNC be c, y and d. x = 180 – (a + b) .....1 y = 180 – (c + d) ......2 Adding 1 and 2, x + y = 360 – (a + b + c + d) = 360 – (2a + 2c) = 360 – 2 × 90 = 180 Thus, lines OM and NP are parallel.
No Credit (No Score)	Any other response or missing response

Item Number	Question 3
Question Code	SAS21M09G0603
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry/Parallel lines | Corresponding Angles
Competency	Apply
Item Type	Multiple Choice Question
Full Credit (Full Score)	60°, reasoning includes properties of parallel lines. 60°, as the lines are parallel, thus corresponding angles will be equal.
No Credit (No Score)	Any other response or missing response

Item Number	Question 4
Question Code	SAS21M09G0604
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Interpret & Evaluate
Item Type	Multiple Choice Question
Full Credit (Full Score)	B. 40
No Credit (No Score)	Any other response or missing response

Item Number	Question 5
Question Code	SAS21M09G0605
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Employ
Item Type	Multiple Choice Question
Full Credit (Full Score)	B. 240
No Credit (No Score)	Any other response or missing response

Item Number	Question 6
Question Code	SAS21M09G0606
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Formulate
Item Type	Multiple Choice Question
Full Credit (Full Score)	C. 45
No Credit (No Score)	Any other response or missing response

Item Number	Question 7
Question Code	SAS21M09G0607
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Employ
Item Type	Multiple Choice Question
Full Credit (Full Score)	D. 90°
No Credit (No Score)	Any other response or missing response

Item Number	Question 6
Question Code	SAS21M09G0606
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Formulate
Item Type	Closed Constructed Response
Full Credit (Full Score)	Writes either isosceles or obtuse or both. Reasoning involves symmetry or measure of angle or both. Isosceles, as the design is symmetrical. Obtuse, as one of the angle is greater than 90°.
No Credit (No Score)	Any other response or missing response

Item Number	Question 9
Question Code	SAS21M09G0609
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Interpret & Evaluate
Item Type	Multiple Choice Question
Full Credit (Full Score)	D. 120°
No Credit (No Score)	Any other response or missing response

Item Number	Question 10
Question Code	SAS21M09G0610
Grade & Chapter Name	Grade 9 | Lines and Angles
Concept | Sub-concept	Geometry | Angle Sum Property of a Triangle
Competency	Interpret & Evaluate
Item Type	Closed Constructed Response
Full Credit (Full Score)	Valid mathematical proof involving properties of triangles. IG is perpendicular to BC, thus triangle IGC is a right-angled triangle. Measure of ∠ICG = 30°. Hence, ∠CIG = 60°. The sides of the triangle IGC are in the ratio 2:1.
No Credit (No Score)	Any other response or missing response